From: Chester Gunn
To: Vishino, Linda
Subject: PCB Results
Date: Monday, January 20, 2003 4:39:01 PM
Attachments: Results.xls

Linda, the attach results shows the elevator systems in both Urbauer and Simon are OK. (no PCBs were detected). The floor except for the pit is OK below 10 ug/100cm2. Urbauer pit floor and liquid in pit sump is contaminated.

Conclusion: The contamination is from years ago (did Washington U flush out the elevator in the 70s?) and the only contaminated of concern is the elevator pit and sump.

Call when you have time to discuss.

Chester "Chuck" P. Gunn
Associate Environmental Engineer
Burns & McDonnell
1630 Des Peres Road
St. Louis MO 63131
ph. 314-821-9016
Fax 314-821-5406
cgunn@burnsmcd.com

PCB CONTAMINATION AT URBAUER HALL

WASHINGTON UNIVERSITY
HILLTOP CAMPUS
ONE BROOKING DRIVE
St. Louis, Missouri 63130

JULY 2003

PROJECT NO. 32577

Burns & McDonnell
Engineers-Architects-Consultants
St. Louis, Missouri

TABLE OF CONTENTS

APPENDICES

LIST OF DRAWINGS

LIST OF ACRONYMS

CFR	Code of Federal Regulations
EPA	United States Environmental Protection Agency
MDNR (DNR)	Missouri Department of Natural Resources
mg/kg	milligrams per kilogram
PCB(s)	Polychlorinated biphenyl(s)
ppm	parts per million
ug/100cm^2	micrograms per 100 square centimeters

1.0 SUMMARY

In 2002, the elevators at Washington University were load-tested, and the cylinders on two elevators failed. When the two elevator cylinders were replaced, the spilled hydraulic fluid, and sand and soil contaminated with hydraulic fluid were remediated as an oil spill. When the hydraulic fluid and contaminated sand and soil were tested for disposal, it was discovered that PCBs were present in the waste from Urbauer Hall. Subsequent testing of the Urbauer Hall's elevator hydraulic system and all hydraulic elevators and lifts installed prior to 1983 at Washington University showed that all are PCB free. (Level of detection 1.5 ppm.) It is believed that the contamination came from the hydraulic fluid used in the Urbauer Hall elevator when it was installed in 1959. Sometime after installation, the PCB contaminated oil was removed and the system flushed to remove any remaining PCBs. See Section 3 - DISCUSSION, for further information.

All twelve wipe tests of the area around Urbauer Hall elevator were below EPA cleanup requirements in 40 CFR 761.125(c)(4)(ii). The only contamination of concern found was the concrete in the elevator pit in front of the cylinder steel supports. The average PCB concentration, 94 ppm, of the top part of the concrete in front of the cylinder is above the 10 ppm cleanup goal for soil in nonrestricted access area. The concrete behind the supports was below 4 ppm. The danger of being in an elevator pit severely restricts access to the pit, but the pit doesn't meet the requirement of a restricted access location found in 40 CFR 761.123. Since the pit does not meet the definition of a restricted access location and to reduce potential exposure to PCBs, the contaminated concrete in front of the supports should be encapsulated with epoxy. The encapsulation should consist of two coats of 20 wet mils of TECHNI-PLUS AEP 20 with 30 x 50 mesh flintshot applied between coats, or equivalent material for encapsulation.

To ensure proper maintenance of the encapsulation and disposal of the contaminated concrete, information on the PCB contaminated concrete must be maintained in Washington University files. A memo to file, this report and all other reports concerning the PCB contaminated concrete should be placed in Urbauer Hall's building files at the Facilities Planning & Management Department. The report and memo to file should also be kept on file in the EH&S office. See APPENDIX A -MEMO TO FILE AND SIGNAGE for a draft of the memo to file. This information must be maintained until demolition or remodeling removes the concrete in the elevator pit. A sign should also be posted in the elevator pit. See APPENDIX A -MEMO TO FILE AND SIGNAGE for the signage. These actions follow 40 CFR 761 Subpart G - PCB Spill Cleanup Policy.

2.0 HISTORY

In the summer of 2002, the elevators at Washington University were load-tested. The cylinders on two elevators (one at Simon Hall and another at Urbauer Hall) failed and were replaced. See Drawing 1 on next page for a drawing of Urbauer Hall's elevator cylinder and pit. The replacement consisted of:

1. raising the elevator to its highest point and locking it in place,

2. removing the piston from the cylinder, and the hydraulic fluid from inside the cylinder,

3. removing concrete, hydraulic fluid, and contaminated sand and soil from around the outside of the cylinder, and the cylinder,

4. placing a new cylinder inside the casing and filling the void between the casing and cylinder with sand,

5. replacing the concrete floor and cylinder steel supports,

6. replacing the piston, connecting the piping, and replacing the lost hydraulic fluids,

7. testing the system and placing the elevator back into service.

Since the hydraulic fluid is an oil product, the hydraulic fluid and contaminated concrete, sand and soil were remediated and the cleanup waste collected for disposal. Simon Hall was remediated on Friday, July 26, 2002 and Monday, July 29, 2002. Fourteen drums of waste were generated for disposal. Urbauer Hall cleanup was performed on Tuesday, July 30, 2002 and Wednesday, July 31, 2002, producing seven drums of waste. The remediation was done as an oil spill and all visible oil contamination sand and soil was removed.

During the disposal of the hydraulic fluid and contaminated sand and soil, seven of the 21 drums were found contaminated with PCBs between 0.5 to 11%. The magnitude of the amount of PCBs found was calculated to be a maximum of 210 pounds or 18 gallons. For the calculations and analytical results, see APPENDIX B - ESTIMATE of PCBs in DRUMS REMOVED from URBAUER HALL, ANALYSES of PCB CONTAMINATED DRUMS and CERTIFICATE of DESTRUCTION.

DRAWING 1

When Washington University was notified by the disposal company that PCBs were present in the Urbauer Hall waste drums, the incident was reported to the MDNR Spill Response Center on 12/23/02 and assigned a case number of 021223-1326-ADC. Since the release might have exceeded the reportable quantity for PCBs (1 pound in any 24 hour period), on January 02, the incident was also reported to National Response Center and assigned a case number of 633199-WARD. Calls were also made to EPA Region 7 Toxics/PCB division and an update made to MDNR Emergency Response Section. Burns & McDonnell was contracted to help determine what needed to be done, insure all EPA and DNR requirements were fulfilled, and supervise any remediation, and Wellington Environmental was contracted to do the additional test and any additional remediation.

For reasons covered in Section 3 - DISCUSSION, it was concluded that the PCB contamination came from Urbauer Hall. Its elevator hydraulic system and surrounding area were sampled on January 6, 2003. Two liquid samples of the hydraulic system fluids, one liquid sample from the elevator pit sump, three boring samples of the concrete in the elevator pit, and ten wipe samples of the concrete and tile floors in the area around the elevator outside the pit were taken. No PCBs were found in the hydraulic system. All ten wipe tests were under the cleanup standard in 40 CFR 761.125(b)(4)(ii) of 10 ug/100cm^2 for nonrestricted access areas. The only concerns were the PCBs found in elevator pit's concrete floor and sump. The PCB concentration in the sump liquid was 2,986 ppm. The concentration in the concrete varied from 3 to 147 ppm, which calculates to a magnitude of 0.3 pound of PCBs. For the analytical results, calculations, and Sampling Plan see APPENDIX C - ANALYTICAL RESULTS of URBAUER HALL SAMPLING, CALCULATION of AMOUNT OF PCBs in URBAUER HALL'S CONCRETE, and SAMPLING PLAN for URBAUER HALL.

After receiving the results from Urbauer Hall, the elevator at Simon Hall was sampled on January 15, 2003. No PCBs were found in the elevator fluid or wipe samples. All three concrete samples had PCBs results below 0.05 ppm. For the analytical results and Sampling Plan, see APPENDIX D - ANALYTICAL RESULTS of SIMON HALL SAMPLING and SAMPLING PLAN for SIMON HALL.

The liquid in Urbauer Hall's elevator pit sump was removed on March 4, 2003 and two wipe samples of the steel supporting the cylinder were taken. ALL the wipe samples were under the cleanup standard in 40 CFR 761.125(c)(4)(ii) of 10 ug/100cm2 for nonrestricted access areas. For the analytical results and Sampling Plan, see APPENDIX E - ANALYTICAL RESULTS of URBAUER HALL STEEL SUPPORTS SAMPLING and SAMPLING PLAN for URBAUER HALL ELEVATOR'S STEEL SUPPORTS.

3.0 DISCUSSION

When Long Elevator (the company who maintains the elevators at Washington University) load tested the elevators, the cylinders failed at Urbauer Hall (Urbauer) and Simon Hall (Simon), which released hydraulic fluid (fluid) from the cylinder. Long Elevator hired Heritage Environmental Services Inc. (Heritage) to remove the fluid and contaminated sand and soil (fluid and soil) from the elevator pits. Heritage remediated Simon first by using a "Vac Truck" to remove the fluid and soil and loaded it into 14 drums. Heritage then remediated Urbauer and loaded the fluid and soil into seven drums. When the drums were tested for disposal, seven drums were found to contain PCBs. Prior to this analysis, Long Elevator and Washington University did not know that the fluid contained PCBs.

For the reasons listed below it was determined that the PCBs came from Urbauer:

- Seven of the 21 drums came from Urbauer, which equals the seven of 21 drums that were contaminated with PCBs. Simon produced the other 14 drums, which did not have any detectable level of PCBs.
- The drums were numbered sequentially as they were filed. The last 7 drums were contaminated and the last 7 drums came from Urbauer
- Urbauer's elevator was installed in 1959 and Simon's elevator in 1985.

Not all the fluid in Urbauer's elevator tank was changed when its cylinder was changed. About half of the fluid remained in the system. When no PCBs (level of detection at 1.53 mg/kg (ppm)) were found in the elevator system (system) at Urbauer, the laboratory analysis was doubled checked and nothing was found to cause doubt about the "Not Detected" results. This supports the conclusion that the original source of PCB's was from initial installation, since removing half of the fluid would not remove all the PCBs.

To insure that Simon's elevator was not a source of PCB contamination it was checked and no PCBs, at 1.47 mg/kg (ppm) level of detection, were found. In addition, all of the hydraulic elevators and lifts throughout the University installed prior to 1983 were sampled for PCB contamination, and all the results were "Not Detected" for PCBs.

It is believed that PCBs were in the Urbauer system when it was installed and some oil containing PCBs was probably spilled during installation or possibly released during the elevator's earlier use. Sometime after installation, the PCB contaminated fluid was removed and the system flushed to remove any

remaining PCBs. The contaminated concrete and liquid found in the Urbauer elevator pit is believed to be the result of the remediation done by Heritage in 2002, the earlier PCBs removal and flushing, or releases before the PCBs were removed from the system. Heritage could have contaminated the concrete or the fluid in the sump by spilling some of the contaminated fluid on the pit's concrete floor while removing contaminated fluid from the casing. The earlier PCB removal could have contaminated the concrete or fluid in the sump by spilling some contaminated fluid on the pit's concrete while the fluid was being removed from the elevator cylinder.

Two liquid samples of the hydraulic system fluids, one liquid sample from the elevator pit sump, three boring samples of the concrete in the elevator pit, ten wipe samples of the concrete and tile floors in the area around the elevator outside the pit, and two wipe samples of the steel supports in the pit were taken. All the results of the 12 wipe tests of the Urbauer system are below the cleanup standard in 40 CFR 761.125(c)(4)(ii) of 10 ug/100cm^2 for nonrestricted access areas. The only contamination found that remains above the cleanup levels referenced in 40 CFR 761.125(c)(4), is the concrete in front of the cylinder supports (looking from the elevator door). The PCB concentration found in the concrete behind the cylinder steel supports was below 4 mg/kg (ppm), which is below the 10 ppm clean up level for soil in nonrestricted areas. If the concrete is flushed or washed with a solvent, the PCBs might move from the concrete to the soil below the concrete. Therefore, this was ruled out as a corrective action. Since the concrete carries the cylinder and its load, removal the concrete would require the removal of the cylinder, which is a time consuming and costly task. Therefore, this was ruled out as a corrective action.

The PCBs found in the concrete in front of the cylinder steel supports varied from 46 to 147 ppm. Since this is above the 10 ppm, clean up level for soil in nonrestricted areas found in 40 CFR 761.125(c)(4)(v), action must be taken to address this issue. Although the elevator pit does not meet the definition of a restricted access area found in 40 CFR 761.123, the pit is closer to a restricted access area than a nonrestricted area. The only personnel entering the pit have been Long Elevator to work on the cylinder, and Heritage Environmental or Wellington Environmental to perform testing or cleanup services. Elevator pits are dangerous places and should not be entered without careful considerations of the dangers and proper lockout procedures. The area can not be entered without overriding the safety lockout on the door.

After considering the Three potential remedial actions:

- Washing the PCB from the concrete

- Removing the concrete
- Encapsulating the concrete

Burns & McDonnell recommends that the concrete area in front of the cylinder support be coated with an epoxy lining, like KCC Corrosion Control's TECHNI-PLUS AEP 20. See drawing on page 2 for the area to be encapsulated. Filler should be used to give a rough surface to reduce the possibility of injuries from slipping on the coating. The coating should consist of two coats of 20 wet mils of TECHNI-PLUS AEP 20 with 30 x 50 mesh flintshot applied between coats, or an equivalent. See APPENDIX F for Technical Information on TECHNI-PLUS AEP 20.

4.0 CONCLUSIONS

- The PCBs contaminated fluid, sand, and soil was from the Urbauer Hall elevator and was disposed of properly.

- Urbauer Hall elevator's hydraulic system is now free of PCBs, "Not Detected" at 1.53 mg/kg (ppm) reporting level.

- The elevator pit sump and contaminated concrete floor in front of the steel supporting the Urbauer Hall elevator's cylinder are above the clean requirement in 40 CFR 761.125(c)(4) and require remedial action such as encapsulation.

- To ensure the concrete encapsulation is properly maintained and any concrete removed is disposed of properly, two signs should be placed in Urbauer Hall's elevator pit. A copy of the sign is in APPENDIX A-MEMO TO FILE AND SIGNAGE.

- To ensure the concrete encapsulation is properly maintained and any concrete removed is disposed of properly, a one page memo to file and this report should be given to the Director of Facilities, Planning and Management to be placed in Urbauer Hall building file. This report and the memo to file should also be kept on file in the EH&S office. For a draft of the memo to file, see APPENDIX A-MEMO TO FILE AND SIGNAGE.

5.0 FUTURE WORK

1. The concrete in front of the Urbauer Hall elevator's cylinder steel supports (including the sump) needs to be encapsulated with an epoxy coating consisting of two coats of 20 wet mils of TECHNI-PLUS AEP 20 with 30 x 50 mesh flintshot applied between coats, or an equivalent encapsulation material. See drawing on page 3 for the area to be encapsulated.

2. Post a sign in the Urbauer Hall elevator pit to ensure the concrete encapsulation is properly maintained and any concrete removed is properly disposed of. For the information on the sign, see APPENDIX A-MEMO TO FILE AND SIGNAGE.

3. A one page notice to file and this report needs to be submitted to the Washington University's Director of Facilities Planning and Management to be placed in Urbauer Hall's building file. This is to ensure the maintenance of the encapsulation, the proper handling and disposal of any contaminated concrete or soil, and the proper sampling of the pit and soil area when demolition or remodeling of Urbauer Hall occurs.

APPENDIX A

MEMO TO FILE and SIGNAGE

WASHINGTON UNIVERSITY MEMO LETTER HEAD

Date: To be complete when floor is coated.

To: File

From: Linda Vishino

Re: URBAUER HALL ELEVATOR

The elevator in Urbauer Hall has been remediated for PCB contaminated hydraulic oil but test results of the concrete floor in the front half of the pit show it is contaminated with less than 150 ppm PCBs. Therefore, the front half of the floor has been encapsulated with two coats of TECHNI-PLUS AEP 20 epoxy sealer. The coating must be maintained until the concrete floor is removed, which is not expected until the elevator or building is demolished.

The concrete floor and the soil below the concrete must be assumed to be contaminated by PCBs unless future tests show otherwise. Therefore, any work requiring the removal of any part of the encapsulation, concrete floor, or soil below it, must be handled as PCB waste. The workers must be qualified and properly protected and all contaminated materials must be properly disposed.

Linda Vishino
Environmental Compliance Officer
Environmental Health & Safety Department

RESTRICTED AREA

DO NOT ENTER WITHOUT APPROVAL FROM ESH OR FACILITIES

314-935-5550
314-362-6816
or
314-935-7864

APPENDIX B

ESTIMATE of PCBs in DRUMS REMOVED from URBAUER HALL,
ANALYSES of PCB CONTAMINATED DRUMS,
and
CERTIFICATE OF DESTRUCTION

APPENDIX C

ANALYTICAL RESULTS of URBAUER HALL SAMPLING,
CALCULATION of AMOUNT of PCBs in URBAUER HALL'S CONCRETE,
and
SAMPLING PLAN for URBAUER HALL

APPENDIX D

ANALYTICAL RESULTS of SIMON HALL SAMPLING
and
SAMPLING PLAN for SIMON HALL

APPENDIX E

ANALYTICAL RESULTS of URBAUER HALL STEEL SUPPORTS SAMPLING, and SAMPLING PLAN for URBAUER HALL STEEL SUPPORTS

APPENDIX F

TECHNICAL INFORMATION on TECHNI-PLUS AEP 20

WORK SCOPE FOR COATING URBAUER HALL ELEVATOR PIT

GOAL - To cover the contaminated concrete in front of the steel supports in Urbauer Hall elevator pit with two coats of a non-slick epoxy.

On day 1 - 11/20/03 Work Item Description - by

1. Meet at elevator at 7:00 am - ALL

2. Lock out elevator - Long

3. Clean the concrete floor with isopropyl alcohol [MEK will work better but IPA will be safer.] - Wellington

4. Stir both part of the E-7 primer and mix [primer can be stirred by shaking can]. - Wellington

5. Cover floor with 3-5 mils of E-7 primer. - Wellington

6. Place elevator back into service - Long

Material required - all supplied by Wellington
Safety glass and gloves
An lel explosion meter to monitor the level of IPA and primer
4 liter to 1 gallon of IPA
Rags to wipe the concrete with IPA
Primer [ordered by BurnsMcD delivery to Wellington] and a container to mix it in
Several 8 to 16 oz containers to measure the 2 part primer
Roller pole and rollers to apply primer
MEK to clean equipment not discarded

On day 2 - 11/21/03 Work Item Description - by

1. Meet at elevator at 8:00 am - ALL

2. Lock out elevator - Long

3. Stir both part of the AEP20.2 and mix [should use a paint stirrer for the resin, hardener can be shaken. Resin can be easily wiped off]. - Wellington

4. Cover floor with 20 mils of AEP20.2 - Wellington

5. Broadcast flintshot onto wet first coat - Wellington

6. Place elevator back into service - Long

Material required - supplied by Wellington
Safety glass and gloves
An lel explosion meter to monitor the level of hardner
AEP20.2 [ordered by BurnsMcD delivery to Wellington] and container to mix it in
Flintshot - ordered by BurnsMcD delivery to Wellington
Several 8 to 16 oz containers to measure the 2 part material
Paint mixer or stick to stir resin
MEK to clean equipment not discarded

On day 3 - 11/24/03 Work Item Description - by

1 Meet at elevator at 8:00 am - ALL

2 Lock out elevator - Long

3 Stir both part of the AEP20.2 and mix [should use a paint stirrer for the resin, hardener can be shaken. Resin can be easily wiped off]. - Wellington

4 Cover floor with 15-20 mils of AEP20.2 being sure to cover flintshot. - Wellington

5 Place elevator back into service - Long

Material required - supplied by Wellington
Safety glass and gloves
An lel explosion meter to monitor the level of hardner
AEP20.2 [ordered by BurnsMcD delivery to Wellington] and container to mix it in
Several 8 to 16 oz containers to measure the 2 part material
Paint mixer or stick to stir resin
MEK to clean equipment not discarded

2003 ANNUAL REPORT ON PCBs

1) **Facility** WASHINGTON UNIVERSITY
One Brookings Drive
St. Louis, MO 63130
EPA # MOD068552207

Calendar Year 2003
January 1, 2003 to December 31, 2003

2) **Disposal Facility** Onyx Environmental Services
Hwy 73 3.5 miles W. of Taylor's Bayou
Port Arthur, TX 77640
TXD000838896

1. PCB Ballasts – 72 Kg
2. PCB contaminated dirt and materials – 2,655 Kg (Urbauer elevator remediation)
3. PCB oil filled motor – 150 Kg
4. PCB oil removed from transformer – 1,200 Kg

3) **Disposal Facility** Safety-Kleen Inc
6125 N. Pecatonica Road
Pecatonica, Il 61063-8879
ILD980502744

1. PCB oil removed from transformer – 150 Kg

- All campus owned hydraulic elevators and man lifts constructed prior to 1983, as well as all transformers were tested. No PCB contamination was found.

Mike Clamors
Printed Name

Signature

Hazardous Materials Manager, EH&S
Title

January 07, 2004
Date

Washington University in St. Louis

Environmental Health and Safety

Washington University Policy for Management of PCBs

1.0 Introduction

This policy identifies the procedures to follow to for managing polychlorinated biphenyls (PCBs) in building materials and equipment on Washington University (WU) campuses and properties. Management of PCBs in materials and equipment must adhere to the requirements of the Toxic Substances Control Act (TSCA) or the PCB regulations at 40 CFR Part 761.

2.0 Background

Caulk put in place between 1950 and 1979 may contain as much as 40 percent PCBs and can emit PCBs into the surrounding air. PCBs from caulk may also contaminate adjacent materials such as masonry or wood. Caulk may be found around window frames and other locations where sealants were utilized.

Fluorescent lighting fixtures that still contain their original PCB-containing light ballasts have exceeded their designed lifespan, and the chance for rupture and emitting PCBs is significant. Sudden rupture of PCB-containing light ballasts may result in exposure to the occupants and may also result in the addition of significant clean-up costs.

Some building materials (e.g., paint and masonry walls) and indoor dust can absorb PCB emissions and become potential secondary sources for PCBs. When the primary PCB-emitting sources are removed, the secondary sources often emit PCBs.

3.0 Responsibilities

The Environmental Health & Safety (EHS) Department manages hazardous and regulated waste including PCBs for all WU operations. WU EHS will coordinate with the appropriate facilities department associated with the WU campus or property for any projects affected by the suspected or confirmed presence of PCBs. WU personnel and Contractors are responsible for adhering to the requirements of this document.

EHS will be responsible for performing or verifying appropriate training levels in WU personnel and contractors.

4.0 PCB Management in Building Materials

Regardless of the size of a project involving potentially contaminated building materials, testing and coordination with WU EHS shall be required if the building/materials involved are either constructed prior to 1980 or previously identified as potentially containing PCBs.

Renovation, repair, or abatement activities of potential PCB-containing or PCB-contaminated materials shall only be performed by qualified and properly trained facilities personnel and contractors.

PCB-contaminated materials remaining in place must be encapsulated through methods approved by the Environmental Protection Agency (EPA) PCB Coordinator. Encapsulation is a containment method that uses a coating material to separate PCB sources from the surrounding environment to reduce surface and air concentrations of PCBs. Encapsulation is only effective at reducing air concentrations to desirable levels when PCB content in the source is low.

Any project approved for PCB-containing material encapsulation will be required to develop a Maintenance Monitoring and Implementation Plan for the affected building to ensure on-going testing and management of remaining PCBs as well as communication to potential affected occupants.

5.0 Notification/Coordination

Project managers or other appropriate facilities personnel shall notify EHS of any project potentially involving PCB-containing materials prior to disturbing these materials.

The EHS PCB Coordinator (or their designee) will work with project personnel to evaluate testing results and determine what level of PCB remediation (if any) is needed for the project based on project material goals. Encapsulation is only considered for materials that must remain in place after removal of substantially impacted materials.

WU personnel and contractors encountering or disturbing potentially PCB-contaminated materials must stop work and immediately notify supervisors/project managers. Upon notification of potential disturbance, these individuals shall immediately contact EHS prior to commencement of project activities in that area.

6.0 Contractor/Disposal Approval

All PCB-containing debris must be disposed through and EHS approved regulated waste management contractor in an approved PCB landfill cell.

All contracts for PCB-containing materials must have an established scope of work for the contractors to bid on. All bids shall be evaluated based on the ability and qualifications to provide the service, cost considerations and adherence to all applicable Federal, state and local requirements.

Once a contractor has been selected, the contract and contractor qualifications including proof of all applicable and appropriate licenses, permits, certifications and insurance shall be sent to WU General Council for review. Contracts shall only be sent for contractor signature after written approval by WU General Council and any additional Purchasing Department and EHS required signatures.

Washington University in St. Louis

Environmental Health and Safety

Washington University Guidance for Management of Encapsulated PCBs

1.0 Introduction

This document identifies the guidelines to follow to for managing encapsulated polychlorinated biphenyls (PCBs) in building structural materials on Washington University (WU) campuses and properties. Management of PCBs in materials and equipment must adhere to the requirements of the Toxic Substances Control Act (TSCA) or the PCB regulations at 40 CFR Part 761 and WU'S *Policy for Management of PCBs*. All building structural materials that have been remediated for the presence of PCBs may have areas where potential impacted masonry beneath PCB caulk was remediated through encapsulation of the surface of the building material.

2.0 Background

Caulk utilized as building material adhesives between 1950 and 1979 may contain as much as 40 percent PCBs and can emit PCBs into the surrounding air. PCBs from caulk may also contaminate adjacent materials such as masonry or wood. Caulk may be found around window frames and other locations where sealants/adhesives were utilized.

Some building materials (e.g., paint and masonry wall) and indoor dust can absorb PCB emissions and become potential secondary sources for PCBs. When the primary PCB-emitting sources are removed, the secondary sources often still contain regulated levels of PCBs.

Some of these secondarily impacted materials are not feasible to remove for regulated landfill disposal. Consequently, an Environmental Protection Agency (EPA) approved sealant is utilized to create a protective barrier that eliminates potential exposure to PCBs from these sources.

Demolition and renovation activities involving PCB-containing materials are closely regulated with EPA required approval of all work and future maintenance and monitoring plans associated with each building project requiring remediation and encapsulation of PCBs.

3.0 PCB Encapsulation in Building Materials

Renovation, repair, or abatement activities of potential PCB-containing or PCB-contaminated materials shall only be performed by qualified and properly trained Facilities personnel and contractors.

PCB-contaminated materials remaining in place must be encapsulated through methods approved by the EPA. Encapsulation is a containment method that uses a coating material to separate PCB sources from the surrounding environment to reduce surface and air concentrations of PCBs. Encapsulation is only effective at reducing air concentrations to desirable levels when PCB content in the source is low.

Any project approved for PCB-containing material encapsulation will be required to develop a Maintenance Monitoring and Implementation Plan (MMIP) for the affected building to ensure on-going testing and management of remaining PCBs as well as communication to potential affected occupants. These Buildings & locations are identified in Attachment A.

4.0 Responsibilities

The Environmental Health & Safety (EH&S) Department is responsible for the management of hazardous and regulated materials including PCBs for all WU operations.

The Facilities Planning & Management Department (FPM) on Danforth Campus and Facilities Management Department (FMD) at the School of Medicine, hereafter referred to collectively as "Facilities" is responsible for preparation of bid specifications and project management for all major construction and demolition projects on their respective campuses through their Capital Projects staff. Additionally, other Facilities Managers (i.e. Danforth Campus Zone Managers) may be responsible for minor repairs and renovation projects.

Responsibilities related to the management of encapsulated PCBs in WU buildings may include but not be limited to training, communication, notifications and record retention as follows:

- EH&S will coordinate with appropriate Facilities personnel identified in the project MMIP associated with the WU campus or property for any projects affected by the presence of encapsulated PCBs.
- EH&S will be responsible for performing or verifying appropriate training levels in WU personnel and contractors.
- Designated Facilities personnel are responsible for managing the communication of the presence of encapsulated PCBs to building occupants, WU personnel, custodial personnel and contractors.
- Communication to contractors from Facilities must include detailed information on the location of the encapsulated materials, restrictions and any training qualifications for workers that may disturb the encapsulated material.
- Designated Facilities personnel are also responsible for maintaining all project documents/records related to the removal and/or encapsulation of PCBs in the remaining building materials. Records may include but are not limited to analytical results, disposal records, work plans, maintenance and monitoring plans and deed restrictions.
- WU personnel are responsible for adhering to the requirements of this document and any required training pertaining to management of encapsulated PCBs.
- Contractors are responsible for adhering to any contract Terms & Conditions and any additional project specific information provided related to the presence of encapsulated PCBs in buildings that are part of the scope of work of their project.

5.0 Notification/Coordination

In order to prevent project delays, advance planning of project scheduling for any activities that could potentially disturb encapsulated PCBs should include the EH&S PCB Coordinator or their designee.

- **Project Managers** or other appropriate Facilities personnel shall notify the EH&S PCB coordinator (or their designee) of any projects that may potentially disturb encapsulated

PCB materials prior to initiation of any project activities. Some work may require notification to the EPA.

- **Project Managers** must notify contractors of any work/services in contracts that will include (or may affect) in areas that have encapsulated PCBs shall also notify the PCB Coordinator when work is planned for encapsulated surfaces.
- **The EH&S PCB Coordinator** (or their designee) will work with project personnel to evaluate potential impacts to encapsulated areas and help determine necessary mitigative measures.
- **WU personnel and contractors** encountering or disturbing encapsulated PCB materials must *stop work* and immediately notify supervisors/project managers. Upon notification of potential disturbance, these individuals shall immediately contact EH&S prior to commencement of project activities in that area.
- **Zone Managers** or other Facilities operation managers must notifying any contractors if work tasks will potentially disturb the encapsulated areas.
- **Facilities personnel** managing contract work planned for encapsulated surfaces must notify the contractor that the work must be performed by workers with HAZWOPER certification or under the supervision of someone with a HAZWOPER certification.

6.0 Training

WU employees are prohibited from performing work that may disturb areas identified as having encapsulated PCBs without prior approval and appropriate training. An approved contractor shall be utilized for the activities. However, University employees that may be responsible for performing work around or near these areas will receive Awareness training from EH&S. Awareness training will be required for the following WU staff:

- WU FPM Mechanics
- WU FPM Zone Managers
- WU FPM Capital Projects Managers
- EH&S staff

EH&S will perform PCB Awareness training annually and gear the information provided to the specific audience and their responsibilities related to areas with encapsulated PCBs. Training may be online based training and or live training sessions. Current training programs for Facilities staff will be updated to include this information including but not limited to:

- **Facilities Annual OSHA Training** (includes environmental program information) – Includes both online web-based training materials and live session
- **EH&S WU Project Manager Training** - conducted as live sessions annually
- **EH&S Annual HAZWOPER Refresher** – Includes both online web-based training materials and live session.

Building occupants, visitors and custodial staff should be provided limited notification of the presence of encapsulated PCBs by Facilities personnel.

Contractors are responsible for providing their staff with appropriate level of training required for the scope of the project potential affecting areas with encapsulated PCBs.

ATTACHMENT A

Buildings Remediated for PCB Caulk with Encapsulated Surfaces

Danforth Campus

1. Bryan Hall – South facing windows red granite and mortar structural materials around windows. Encapsulation work completed in August 2016.

Washington University in St. Louis

Environmental Health and Safety

WU SOP FOR WORK ACTIVITIES IN PCB ENCAPSULATED AREAS

This standard operating procedure (SOP) provides precautionary measures and best work practices that will be followed when conducting a repair or renovation where polychlorinated biphenyl (PCB)-containing stone could be encountered and exposed (encapsulation barrier removed, broken or damaged). This SOP is based on information provided by the U.S. Environmental Protection Agency (EPA).[1]

The work practices will employ protective measures during a renovation/repair, leave the work area clean and safe for building occupants, and properly dispose of waste materials. Protective measures will always be used to provide direct personal protection of workers and building occupants, as well as to prevent spreading PCB dust to other surrounding areas.

OCCUPATIONAL PROTECTION

Washington University in St. Louis employees will use suitable personal protective equipment (PPE) for dust-generating work methods. PPE will include: chemical-resistant gloves, Tyvek disposable coveralls and shoe covers, safety glasses or protective goggles, and respiratory protection. In addition, eating, drinking, and smoking will be prohibited in the work area. For work involving significant dust generation, showers and separate changing areas for work clothing and everyday clothing will be provided.

COMMUNICATION WITH OCCUPANTS

Clear communication with all stakeholders (e.g., building occupants and workers) will be conducted to create a safe working environment. Affected groups will be informed of: the goals, type, and length of the renovation activities; health and safety aspects of the project; and site access requirements and limitations.

Site security measures will be used to prevent access of unauthorized persons to the work areas until after the final cleanup. Security measures will include: signs, locked doors, barrier tape and/or cones to keep all non-workers out of the work area. As needed, trained site personnel will accompany visitors at all times and provide them with appropriate PPE.

WORK AREA SET UP

When working on a renovation or repair job with potential PCB-containing materials, appropriate controls will be put in place to minimize spreading dust during the renovation and/or repair activity. At a minimum, work areas will be protected from non-work areas by constructing containment. Plastic sheeting will be applied to the floor, ground, or other applicable surfaces to prevent contamination of the building interior from dust generated by the work. Containment will be constructed so that all dust or debris generated by the work remains within the area protected by the plastic. Placing the containment area under negative air pressure will also be used when

[1] https://www.epa.gov/pcbs/polychlorinated-biphenyls-pcbs-building-materials#Information-Contractors

necessary. Use of high efficiency particulate air (HEPA) filters will be utilized to minimize dust release. The size of the containment area and dust controls that will be used will vary depending on the size of the renovation or repair, the methods used, and the amount of dust and debris that will be generated as a result of the renovation or repair activities. Workers will control the spread of dust outside the work area by vacuuming off Tyvek suits and tools when exiting the work area, removing disposable shoe covers, and wiping or vacuuming shoes so the dust stays inside the work area.

When the job is complete workers will:

- Make sure all trash and debris are disposed of properly.
- Vacuum any exposed surfaces, including walls and floors, with a HEPA-filtered vacuum cleaner.
- Mist dusty sections of the plastic sheeting with water before taking them down to keep dust from becoming airborne.
- Remove plastic sheeting carefully, by folding it with the dirty side in, taping it shut, and properly disposing of it.
- Vacuum all surfaces again with a HEPA-filtered vacuum cleaner.
- Scrub the work area with a general-purpose cleaner on a wet rag or mop until dust and debris are removed.
- Visually inspect the work to ensure that no dust or debris is present and re-clean the area thoroughly if dust or debris is identified.
- Where required, coordinate surface and/or air sampling of the work area to ensure criteria are maintained.

SMALL RESPONSE TASKS

Small tasks that involve response to a situation such as a broken window frame adjacent to the PCB-containing façade will involve the following response actions:

- Notify the PCB Program Coordinator with details of the required task.
- Isolate the area. Close doors and move furniture in the immediate area if necessary for access.
- Choose appropriate PPE.
- Confine and contain any broken materials and position the portable containment apparatus.
- HEPA vacuum dust and small pieces of solid material.
- Remove the damaged window frame sections inside the portable containment apparatus.
- Damp wipe all surfaces in immediate area.
- Put all contaminated items (e.g., gloves, clothing, etc.) into a sealed container or bag.
- Contact PCB Program Coordinator for PCB waste pick-up and disposal.

PCBs in Window Caulk

All windows and other building materials containing caulk or a similar adhesive could potentially contain Polychlorinated Bi-Phenyls (PCBs)

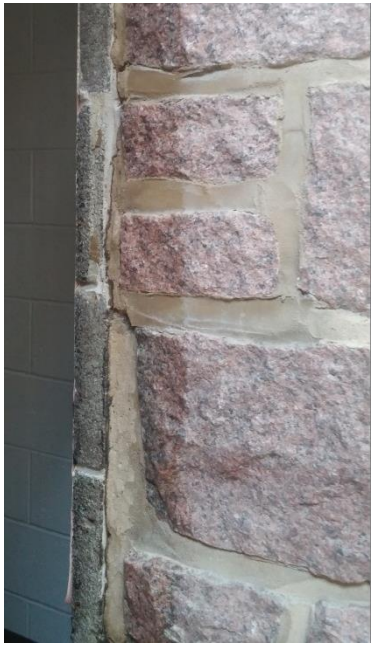
- Certain materials will be tested for the presence of PCBs –primarily window caulk - if the building is deemed to have the potential presence of PCBs in building materials (i.e. construction in 60s & 70s).

- Demolition or construction projects may require the removal of the caulk by qualified individuals, trained to handle and properly dispose of hazardous materials such as PCBs and asbestos (which is often a component of PCB containing caulk).

PCB Encapsulated Areas

PCBs that have leached into concrete, rock and other structural building materials may not be feasible to remove.

- Encapsulation is a process to seal these materials and prevent exposure to the PCBs remaining in the structural materials.
- Work on or near the materials must be authorized by the EH&S PCB Coordinator and by FPM management personnel familiar with the area of encapsulation.
- Work must only be performed by qualified, trained individuals.



Currently only one building on campus affected:

Bryan Hall – South facing windows red granite & mortar - **All floors**

OSHA TRAINING March 13, 2019

DEPT. NUMBER	EMPL ID NUMBER	EMPLOYEE NAME	EMPLOYEE SIGNATURE
0996	077256	AMSDEN, MELVIN	
0996	348139	ATWELL, AARON	
0996	344310	BACKUES, TIMOTHY	
0996	066581	BARTHOLOME JR, RICHARD	
0996	077224	BASS, YONDELL	
0996	082262	BLAKE, DANIEL	
0996	114978	BRINLEY, JOHN	LEAVE
0996	064494	BROOKS, TODD	
0996	033191	BUNDY, KERRY	
0996	375712	BURCHETT, NEILL	
0792	055617	CAGLE, BRADLEY	
0996	316782	CARMAS, P. DANIEL	
0996	376055	CHASE, MATT	
0996	318313	CHESIRE, NATHEN	
0996	088520	DENZL, KEVIN	LEAVE
0996	115250	DINKELKAMP, KEITH	
0996	323054	DOWNEY, ROBERT	
0996	316818	DOWNING, L. BRIAN	
0996	339507	DURKOVIC, RICKY	
0996	072345	EISENREICH, VINCENT	
0996	320978	EVANS, MICHAEL	
0996	091704	FEAMAN, ANTWOINE	
0792	334380	FISCHER, JOSHUA	
0996	353506	FLEMING, MEKOLE	
0996	056593	FRANKLIN, W. JASON	
0694	023183	FRANTZ, RANDY	
0996	064073	GADDY, BRIAN	

Amsden thru Gaddy

DEPT. NUMBER	EMPL ID NUMBER	EMPLOYEE NAME	EMPLOYEE SIGNATURE
0996	093847	GANN, PHILLIP	
0996	371118	GENTRY, BRANDON	
0996	324890	GLORE, MICHAEL	
0996	038249	GRANT, RANDY	
0792	329461	HANKAMMER, JASON	
0996	058608	HEDGCORTH, STEVE	
0996	054875	HEFFERNAN, WILLIAM	
0996	344379	HELLEBUSCH, NICHOLAS	
0996	339360	HOGUE, DEVLYN	
0996	380716	HORN, TODD	
0996	353371	HRDLICKA SR, GREGORY	
0792	088003	JANSSEN JR, RONALD	
0996	328436	JONES, STANFORD	LEAVE
0996	371367	KECK, ERIC	
0996	324628	KEIL, CHRISTOPHER	
0996	030070	KEMPER, RANDAL	
0996	311297	KEUNE, RICHARD	LEAVE
0694	316786	KNICKMEYER, ANTHONY	
0996	114333	KNOWLTON, ANTHONY	
0996	349544	KOESTER, LOIS	
0996	371513	LANDUYT, MARK	
0792	303530	LINCK, KEITH	
0996	373288	LOGUE, JOHN	
0996	103725	LOWELL, JANE	
0796	056531	MARCH, DOUGLAS	
0996	059257	MARTIN, JOSEPH	
0996	367734	MASOUMI, ALI	
0996	059327	MASTERS, WILLIAM	

Gann thru Masters

DEPT. NUMBER	EMPL ID NUMBER	EMPLOYEE NAME	EMPLOYEE SIGNATURE
0792	373678	McCURDY, DOUG	
0792	066759	McGUIRE, JAMES	
0996	321167	MEES, ROBERT	
0796	094489	MEYER, DAVID	
0996	343289	MOORE, PHILIP	
0796	343513	NELSON, BRIAN	
0996	334447	NICASTRI, JOHN	
0996	305357	NICHOLSON, KEITH	
0996	305418	O'DONNELL, JAMES	
0996	090270	OVERMANN, RICHARD	
0996	316680	PEEK, K. MICHAEL	
0996	363881	PENNINGTON, KENNETH	
0996	064138	PHILLIPS, JAMES	
0996	308831	PITTS SR, DARIN	
0996	077456	POST, WENDALL	
0996	324659	PUZZO, ANTONIO	
0996	384585	RAINS, KOREY	
0996	384750	REILLY, DANIEL	
0996	327485	RENNER, PAUL	
0996	359620	RICE, JOSHUA	
0996	110895	RILEY, JONATHAN	
0996	094260	ROBISON, DOUGLAS	
0996	339303	RODGERS, A. SHEA	
0996	359585	ROELLCHEN, JERRY	
0796	351325	ROSSON, STEVEN	
0996	367433	RUDOLPH, CHRIS	
0996	072088	RUSSELL, R. EUGENE	
0996	327627	SANTEL, NATHAN	

McCurdy thru Santel

DEPT. NUMBER	EMPL ID NUMBER	EMPLOYEE NAME	EMPLOYEE SIGNATURE
0996	339483	SCHMIDT, EDWARD	
0996	085311	SCHUCHARDT SR, STEVEN	
0996	032866	SLINKARD, GERALD	
0996	066215	SOMMER, MARK	
0792	328111	SPIES, TODD	
0996	330575	STEINAU, DANIEL	
0996	061179	STRAHAN, BRIAN	
0996	359590	SULLIVAN, PAUL	
0996	094110	TODISMAN, JEFFERY	
0996	093936	UTZLER, CLAYTON	
0996	354200	VANDEVOORDE, JACOB	
0996	348181	VIERLING, ANTHONY	
0996	325073	WACHTER, JOSEPH	
0996	312076	WADE, JAMES	
0792	350400	WIEGMANN, RYAN	
0996	321305	WINKELMANN, RONALD	
0996	344476	WOODS, DENNIS	
0996	344369	ZOTTA, HAROLD	

Schmidt thru Zotta

OSHA TRAINING
March 16, 2017

OSHA TRAINING March 13, 2019

DEPT. NUMBER	EMPL ID NUMBER	EMPLOYEE NAME	EMPLOYEE SIGNATURE
0910	350738	AMBROSE, JAMES	
0910	358266	ANDERSON, CHRISTOPHER	
0510	072349	AVERBECK, BRAD	
0710	082669	BARRY, EDWARD	
0710	063835	BUSBY, ROBERT	
0910	332085	CRUZ, MARVIN	
0694	037325	DILL, MARY ANN	
0910	384992	DOUGHTY, TYLER	
0710	024500	DOWNEY, LARRY	
0910	329407	ENGLAND, CRAIG	
0910	383396	FLANDERS, JOSEPH	
0910	311162	GARCIA, JUAN	
0910	381104	GUERRERO ZAMORA, FABIO	
0910	064379	HALL, ROBERT	
0910	314234	HART, MICHAEL	
0510	367474	JANKO, JORDAN	
0910	028923	KOERKENMEIER, JOHN	
0910	313048	LANGE, MARTIN	
0910	341860	LYNCH, RYAN	
0910	058486	MEYER, BRENDA	
0910	367042	MOLITOR, KURT	
0910	343384	PADGETTE, DIANE	
0710	352105	ROTH, JEFFREY	
0710	355263	SAVAGE, MATTHEW	
0910	033246	SCHADE, JAN	
0510	087942	STARKEY, MICHAEL	
0910	327586	THEILING JR, KENT	
0710	325235	THOMA, THOMAS	
0910	358256	THOMPSON, DREW	
0710	329684	WATKINS, KEVIN	
0510	093672	WEATHERSBY, RENITA	
0910	114548	WIETER, ALAN	

OSHA TRAINING March 13, 2019

DEPT. NUMBER	EMPL ID NUMBER	EMPLOYEE NAME	EMPLOYEE SIGNATURE
		Ryan Lynch	
		Joe Flanders	Joe Flanders
		TONY Childs	Tony Childs
		John Koerkenmeier	John Koerkenmeier

Washington University in St. Louis
ENVIRONMENTAL HEALTH & SAFETY

July 3, 2019

Annah Murray
Regional PCB Coordinator
Waste Remediation and Permitting Branch
Air and Waste Management Division
U.S. Environmental Protection Agency Region VII
11201 Renner Blvd
Lenexa, Kansas 66219

Re: Compton Hall

Dear Ms. Murray,

This is a notification regarding a June 2019 facilities project on our Compton Hall building, located on our main Danforth Campus, which resulted in the disposal of window caulk that we are treating as though contained PCBs.

On June 7, 2019, a member of the University's environmental health and safety staff observed contract workers performing tuckpointing on Compton Hall. Some of the tuckpointing work appeared to disturb existing caulk. Washington University in St. Louis (WUSTL) policy on caulk removal requires that caulk be tested prior to removal for the presence of PCBs. This caulk removed from Compton Hall was not tested prior to removal. However, WUSTL has confirmed that the tuckpointing contract workers wore heavy work gloves and half-face respirators during the project, thereby mitigating exposure potential.

Upon learning about this event, the University took several actions including:

- WUSTL submitted samples from remaining on-site waste for laboratory analysis. The sampling reports (attached) are inconsistent, indicating various PCB levels above and below regulatory actionable levels. However, the University is addressing this matter as though the caulk contained PCBs.
- WUSTL notified the contractor and disposal company about the possibility of PCB waste, and attempted to retrieve the waste for proper disposal. Unfortunately, the disposal company had already intermingled the waste and was unable to pinpoint the ultimate disposal location.
- WUSTL engaged an environmental company to gather all waste remaining on-site for proper disposal per PCB disposal requirements.
- WUSTL restricted access to the work site until caulk remnants were removed by an environmental company and staged for disposal.
- WUSTL has initiated an investigation to identify the root cause of this event and opportunities for process improvements.
- WUSTL Facilities Department personnel have completed refresher training on caulk removal requirements

WUSTL will be engaging a qualified environmental contractor to develop a work plan in accordance with EPA's guidance on caulk remediation.

Please feel free to contact me for further clarifications if needed.

Sincerely,

Linda Vishino

Linda Vishino
Director, Office of Environmental Compliance